**🎯 Activity 4: ⚖️ Scenario-Based Comparison – “Who Reacts Faster?”**

**🧪 Type:** Scenario-Based MCQ (React & Predict)  
**🎯 Target Skill:** Predict chemical behaviour using outer shell electrons in realistic situations

**🎙️ Activity Introduction 🎤**

**Narration:**  
"Different elements react in different ways based on how full or empty their outer shells are. In this game, you will step into real-life science scenarios. Use the clues from electron arrangements to decide which element is more likely to react, gain, or lose electrons. Think like a chemist in action!"

**👨‍💻 Developer Guide Instructions**

* Display realistic scenarios with supporting context text.
* Use two diagram icons per question (e.g., atom shells or electron configurations).
* Present MCQ interaction per scenario with three clear options.
* Show **specific facilitative feedback** for both correct and incorrect responses.
* Allow learners to retry specific scenarios from a summary screen.
* Conclude with general narration.

**📋 Learner Instructions (On-Screen)**

1. Read each scenario carefully.
2. Use the electron arrangement to compare the elements.
3. Choose the element that best answers the question based on reactivity or electron behaviour.
4. Submit your choice and review the feedback to understand your selection.

**💡 Hint Panel (On-Screen)**

**Key Reminders:**

* Atoms with 1 or 2 outer electrons → likely to lose electrons → More reactive metals.
* Atoms with 6 or 7 outer electrons → likely to gain electrons → More reactive non-metals.
* Full outer shells (e.g., 2.8.8) → Stable, not reactive.
* Total electrons = Atomic Number.
* Use the outermost shell to make your decision.

**🧪 Scenario-Based Questions with Feedback**

**🧩 Scenario 1: Battery Builder**

**Scenario:**  
A battery manufacturer is selecting a metal that will easily give away its outermost electron. Two samples arrive:

* Sample A: 2.8.1
* Sample B: 2.8.2

**Question:**  
Which metal is more likely to lose electrons and be used in the battery?

**Choices:**

* ☐ Sample B (2.8.2)
* ☑ Sample A (2.8.1)
* ☐ Both are equal

**Facilitative Feedbacks:**

* **Sample A:** Correct. One valence electron is easier to lose, so it reacts faster.
* **Sample B:** Two valence electrons take more energy to remove. Check again.
* **Both:** One sample is clearly more reactive than the other.

**🧩 Scenario 2: Reactive Rescue**

**Scenario:**  
A chemist is trying to capture harmful gases in the lab using a highly reactive non-metal. She has:

* Gas A: 2.6
* Gas B: 2.8.6

**Question:**  
Which gas is more likely to gain electrons quickly in a chemical reaction?

**Choices:**

* ☑ Gas A
* ☐ Gas B
* ☐ Both react equally

**Facilitative Feedbacks:**

* **Gas A:** Correct. Fewer energy levels = stronger pull on electrons.
* **Gas B:** More shells reduce attraction to new electrons.
* **Both:** Not quite. The one with fewer shells gains electrons more easily.

**🧩 Scenario 3: Inert or Alert?**

**Scenario:**  
An experiment needs a gas that does not react with anything. The lab has two cylinders:

* Cylinder A: 2.8
* Cylinder B: 2.8.7

**Question:**  
Which gas is chemically stable?

**Choices:**

* ☑ Cylinder A
* ☐ Cylinder B
* ☐ Both

**Facilitative Feedbacks:**

* **Cylinder A:** Correct. Full outer shell = stable noble gas.
* **Cylinder B:** One electron short = very reactive.
* **Both:** Only one has a full outer shell.

**🧩 Scenario 4: Quick Metal Reaction**

**Scenario:**  
You are testing metals in water to see which reacts violently. You test:

* Metal X: 2.8.8.1
* Metal Y: 2.8.8.2

**Question:**  
Which metal is more reactive in water?

**Choices:**

* ☑ Metal X
* ☐ Metal Y
* ☐ Neither

**Facilitative Feedbacks:**

* **Metal X:** Correct. Easier to lose 1 valence electron = faster reaction.
* **Metal Y:** Two valence electrons = more stable than 1. Less reactive.
* **Neither:** Look at valence electrons. One has clear reactivity advantage.

**🧩 Scenario 5: Bond Builder**

**Scenario:**  
You are forming a compound. You need an element that wants to gain 1 electron. Two options:

* Element A: 2.8.6
* Element B: 2.8.7

**Question:**  
Which element is most likely to gain one electron to become stable?

**Choices:**

* ☐ Element A
* ☑ Element B
* ☐ Both

**Facilitative Feedbacks:**

* **Element B:** Correct. Needs only 1 more to complete its outer shell.
* **Element A:** Needs 2 electrons—not as close to full shell.
* **Both:** Only one needs just one more to become stable.

**🎙️ Activity Conclusion 🎤**

**Narration:**  
"You have analysed real-world reactions based on valence electrons. Whether choosing metals for batteries or gases for safe storage, you now understand how to compare elements using electron behaviour. Well done!"

**✅ Key Takeaways:**

* Electrons occupy **energy levels (shells):** 1st = 2, 2nd = 8, 3rd = 8 (first 20 elements), 4th starts at Potassium.
* **Electron configuration** shows distribution of electrons (e.g., Calcium = 2.8.8.2).
* **Dot and cross diagrams** represent electrons around the nucleus.
* These diagrams highlight **valence electrons**, helping predict reactivity.